Bryophytes and Tracheophytes

Bryophytes:

Bryophytes are on of the two main groups of kingdom 'Plantae' the second being the 'tracheophytes'. Bryophytes is a group of plants which are multicellular, photosynthetic eukaryotes; and their reproductive organs are multicellular; their zygote develops into small, protected embryo that develops into a complete new hence bryophytes have also been called embryophytes. The cell of these plants is made up to cellulose.

Characteristics of Bryophytes

The important characteristics of Bryophytes are as follows:

1. Bryophytes are plants without vascular tissue (xylem a phloem), whereas tracheophytes have vascular tissue. Therefore tracheophytes are vascular plants, whereas bryophytes are non-vascular plants.

2. Bryophytes are the simplest land plants. Bryophytes divided into three groups. Liverworts, hornworts, and mosses.

3. Marchantia is an example of liverworts; its plant body is a thick branched green thallus.

4. Anthoceros is a hornwort, and Funaria is a moss.

5. All bryophytes and generally found growing in moist habitants such as damp soil and rocks, moist brick walls, and along the banks of streams.

Life Cycle of Funaria Moss:

It is a common moss found grwoing t moist places. Green leafy, moss plant of Furania, as like all Bryophytes, Funaria is haploid gametophyte, its height is about 0.5 - 1 inch.

Gamatophyte Generation

It consists of 3 parts:

1. A vertical stem like structure.

2. Leaf like photosynthetic structures arranged on the stem, which are composed of a single layer of cells, and without stalk.

3. Numerous multicellular rhizoids, arising from the lower side of the stem and which absorb water and salts, and anchor the plant to the soil.

Male sex organs, called antheridia (singular antheridium) are located at the tip of male branch, and the female sex organs, called archegonia (singular archegonium) are located at the tip of female branch.

Fertilization takes place in the presence of water within the archegonium located at the tip of female branch. The zygote develops into the embryo (2n). The embryo forms the sporophyte (2n). The sporophyte remains attached to the tip of female branch. The sporophyte gets water, slts and also part of its food, from the parent gametophyte plant.

Sporophyte Generation

The sporophyte consists of three parts:

1. A foot

2. A long stalk like seta

3. Capsule

The foot is anchored to the female branch and absorbs nutrients from the gametophyte. The seta elevates the capsule in the air. Within the capsule, haploid spores are produced by meiosis. The spores are dispersed by wind. Each spore develops eventually into new haploid gametophyte plant, and the life cycle continues.

Like other bryophytes, Funaria also has well defined alteration of generations; haploid gametophyte generation is dominant, whereas diploid sporophyte is attached to and more or less dependent on the gametophyte.

Pteridophytes:

1. Unlike bryophytes the plant body in Pteridophytes is differentiated into root, stem and leaves.

2. In contrast to other vscular plants Pteridophytes do not bear flowers, fruits and seeds.

3. Due to presence of vascular tissues, they are similar to gymnosperms and angiosperms.

4. Although the dominant generation in Pteridophytes is also the sporophyte but unlike gymnosperms and angiosperms both sporophyte and gametophyte generations are independent and free living. However, the gametophyte in much reduced and smaller in size.

Spermatophytes:

Seed plants or Spermatophytes are that group of vascular plants which produce seeds. Seed is a ripened ovule. It contains a young plant with embryonic root, stem and one or more leaves, which has stored food material and is protected by a resistant seed coat or testa.

Spermatophytes like pteridophytes possess vascular tissues. They also have life cycles with alternation of generations. Unlike bryophytes and pteridophytes, spermatophytes do not have free living gametophyte; instead the gametophyte is attached to and nutritionally dependend upon the sporophyte generation.

Main Groups of Spermatophytes:

Gymnosperms

They produce seeds which are totally exposed or borne on the scales of cones.

Angiosperms

They are flowering plants which produce their seeds within a fruit.

Pinus and Thuja - The Typical Gymnosperm:

Pinus is normally grows at an altitude of 5000 ft to 8000 ft. It has many types e.g. chir, kail, chilghoza etc. However, some species are found in the plains. It is also grown as ornamental plants. Pinus tree is a sporophyte, which is evergreen and quite tall. It consists of an extensive root system and a strong, stout and woody stem and its branches. The upper branches progressively become shorter in length. In this way, the tree assumes a symmetrical conical shape.

Thuja

Thuja (common known as MorPankh) is a short tree. It has profuse branches, which are covered with small, dark green scale leaves. It is conical in appearance. It is grown as ornamental plant in parks and homes.

Leaves of Thuja

Thuja has small scale like green leaves that cover the stem.

Female Cone of Thuja

In Thuja the female cones are spherical or oval in shape. These are about the size of a bair (berry). They consist of hard, brown colour scales with triangular apices.

Pinus:

Pinus has two types of shoots.

Shoots of Pinus:

Long Shoots or Shoots of Unlimited Growth

They are formed on the main stem and continue growth indefinitely by buds borne at their apices. They are covered by scale leaves.

Dwarf Shoots or Shoots of Limited Growth

These shoots originate in the axils of the scale leaves on the long shoots. They are very short (only a few millimeters in length). Each dwarf shoot bears 1 t 5 foliage leaves in addition to scales leaves.

Leaves of Pinus:

Scale Leaves

These are small, membranous and brown in colour. They cover the stem.

Foliage Leaves or Needles

These are commonly long and narrow, tough, and leathery. In contrast to scale leaves they are green and photosynthetic. Depending upon the type of species, a cluster of 2 to 5 needles is produced on each dwarf shoot. Each dwarf shoot with its cluster of needles is called a spur.

Reproduction in Pinus:

Pinus tree produces reproductive structures known as cones every year. Cones are of two types, male and female c9ones. Both male and female cones are produced on the same tree but on different branches.

Male Cone of Pinus

Male cones, usually 1 cm or less in length, are much smaller than the female cones. They are produced in clusters. These are generally born on the lower branches of the tree. Each male cone is composed of spirally arranged leaf-like structures called scales or microsporophylls. Each microsporophyll has two long sacs called pollen sacs of microsporangia on it are under surface. Asexual reproductive cells, microspores or pollen grains are produced by meiosis in the microsporangia. Pollen grains are haploid. After being transferred to the ovule, the pollen grain forms pollen tube. It is the male gametophyte in which male gametes or sperms are produced.

Female Cone of Pinus

The female cones are much larger than the male cones. These are usually found on the upper branches. Each female cone is also made of spirally arranged scales which are called megasporophylls. These scales become woody on maturity. Two ovules are present side by side at the base of each scale. Haploid megaspores are formed in the ovule by meiosis. Measpores give rise to female gametophytes which produce female gametes. Fertilization results in the formation of embryo after which the ovule is ripened to form seed. Female cones normally remain attached for three years on the plant. On maturity the cones open up and the seeds are set free and dispersed.

Angiosperms:

Angiosperms are the flowering plants which are most successful plants. They are more important than the gymnosperms. They have adapted to almost every type of environment. There are about at least 235,000 species. They are dominant plants. Angiosperms are vascular plants which bear flowers. Their seeds are produced within fruits. The fruit protects the developing seeds and also helps in their dispersal. Seed and fruit producing habit have helped flowering plants in their evolutionary success.

Angiosperms are found in wide variety of sizes and forms. Ensize they range from over 300 ft in height (some species of Eucalyptus) to searcely 1mm in length (duckweed, Woiffia).

On the basis of size and woody texture, angiosperms are classified as herbs, shrubs (bushes) and trees. Herbs are the plants which are small in size. Their stems are Herbs which are then cut or pulled from the soil. In contrast shrubs and trees have hard woody stems, which retain their shape even after being cut. Shrubs are shorter than trees but have more branches. In addition to

tracheids, angiosperms have efficient water conducting structures known as vessels in their xylem.

Classes of Angiosperms:

On the basis of the number of cotyledons in the seed, angiosperms are divided, into two classes.

1. Monocotyledons or Monocots

2. Dicotyledons or Dicots

Monocots

1. Monocot seeds have only one cotyledon or embryonic leaf.

2. A nutritive tissue called "endosperm" is usually present in the mature seed.

3. Monocots are mostly herbs with long narrow leaves.

4. Leaves have parallel veins i.e. in the lamina of the leaf veins run parallel to one another.

5. The floral parts of most flow3ers usually occur in threes or multiples of three (i.e. 3, 6, 9 ...)

6. Monocots include different grasses, cereals (wheat rice, maize etc) ,palms, onions and lilies.

Dicots

1. Dicot seeds have two cotyledons.

2. In mature seed, te endosperms is usually absent.

3. Their leaves vary in shape but usually are broader than monocot leaves.

4. Leaves have reticulate veins i.e. branched veins resembling a net. The flower parts are four or five in number or multiples of 4 or 5.

5. Dicots include rose, peas and pulses, sheesham, Kiikar (Acacia), sarsoon (mustard), cacti, mango, orange and sunflower etc.